

AVIATION WEEK

JULY 3, 1950

John Casey at Chicago knows!

Chicago's big Midway Airport is one of the busiest in the world. And John A. Casey, its manager, is a leader in progressive airport operation. He knows how important it is to avoid delays in landing and take-offs. Mr. Casey says: "The installation of the high intensity runway lights at Chicago Midway Airport in 1948 was the 'missing link' in the completion of the chain of landing aids used under conditions of restricted visibility. The high intensity runway lights are a perfect implementation of the ILS and GCA. All comment has been extremely favorable, with not one complaint."



ask the men who KNOW L-M high intensity runway lighting!

● Airport managers, airline men, and pilots who use and know L-M High Intensity Runway Lighting can tell you from their own experiences, and from situations that they personally have observed, how important it is to have good lighting to delineate the runways in good weather or bad. Ask some of the men who know. Then ask the L-M Field Engineer for details, or write: Airport Lighting Division, Line Material Co., East Stroudsburg, Pa. (or McGraw Electric Company Division).



LINE MATERIAL Airport Lighting

Hank Cross at Birmingham knows!

"When I was test flying B-29's here during the war and until 1949, the blackest area north and east of the city from the air was the municipal airport. The mountains and smog conditions peculiar to Jones Valley added to the problem," writes H. T. Cross, well-known Director of Aviation of Alabama's biggest municipal airport. "Last fall we installed high intensity lighting all three runways. Airlines, pilots, and to operators are all most enthusiastic. Pilots report seeing the lights more than fifty miles away. Typical pilot's comment: 'Now I won't be tempted to let down on the First Avenue street lights instead of the runway!'"



H. C. Wright at Nashville knows!

When you ask the men who know, you'll invariably get an enthusiastic answer from H. C. Wright, the capable superintendent of Berry Field. "We've had some remarkable experiences here since we installed high intensity lights on our instrument runway, and their performance has been most gratifying to pilots and to the city. The controllable beam eliminates glare while taking full advantage of the high candle power. The lights are most definitely paying for themselves in improved operation and increased safety for ships and passengers. We are amazed at the unusually low operating cost of the high intensity lights. We've had three knocked down by incoming aircraft and they were reinstalled at a very nominal cost."



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These leading U. S. Navy
SHIPBOARD FIGHTERS
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All twin engine fighters for the Navy's newest carrier-based jet squadrons are powered by the J-36. This light and slim Westinghouse engine lends itself ideally to a twin engine installation which in turn provides the conserving safety factor of single engine operation in times of emergency.

The designers of these surfaces chose the J-36 because it combines high power with low weight. These factors plus the power, dependability and performance of the engine assure that the air striking force of the United States Navy will be second to none.

J-3600-8



B.F. Goodrich



It's rough on subs, smooth on runways

Aircraft with electronic search equipment need a type of construction that is lighter, yet gives longer wear. And the wheels themselves are light, among magnesium castings.

As a result, the B. F. Goodrich assembly on the Lockheed F7W-3 offers considerable weight over other designs and it provides smoother, safer take-offs and landings. BFG tires cannot lock or grab. They respond smoothly and quickly to maximum pressure. They take emergency overloads better.

BFG looks also increase plane roll stability. There's less rolling when tire replacements and repair. Replacing old

can be handled with a screwdriver and wrench. Wear on all parts is slower because the load is evenly distributed.

The same wheels and assembly as the Neptunes are equipped with B. F. Goodrich tires and tubes for maximum safety and economy. The complete B. F. Goodrich wheel assembly is one of many effective solutions to aviation problems performed by B. F. Goodrich research. The B. F. Goodrich Co., Aeronautical Div., Akron, Ohio.

B.F. Goodrich
FIRST IN RUBBER

"EXCEPTIONAL SERVICE"



SKYWAYS, INC. at Vandenberg (Dayton) Ohio, is an airport operation in model stage. Flying flyers get the personal assistance of the heads of the business — Don E. Coates and Miles D. Rodts (see photo). "We're proud," they say, "of the quality of our service and products. And Texaco's quality and nation-wide resources have been big factors in building our business."

Skyways, Inc. backs it up with TEXACO LUBRICANTS AND FUELS

A LETTER addressed to Skyways, Inc., Dayton, Ohio, states: "I want to compliment you on the exceptional service you extended to me as a visiting flyer. As a 'flying businessman' it is a real treat to come in contact with an organization like yours . . ."

It personal service like that backed by Texaco Aviation Lubricants and Fuels, that is building business for progressive airports everywhere. And how the Texaco sign on your hangar helps! It's known as flyers throughout the 48 States as a symbol of quality produced by millions of miles of superior performance.

When you handle Texaco you have a complete line to offer. And the more fuel than you're associated with

Texaco puts you up with the leaders. Progressives airports, aircraft manufacturers and airlines prefer Texaco. In fact —

More revenue airplane miles in the U. S. are flown with Texaco Aircraft Engine Oil than with any other brand.

Let a Texaco Aviation Representative show you how you can build business with Texaco. Just call the nearest of the more than 2,800 Texaco Wholesale Distributing Plants in the 48 States, or write:

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TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

News Picture Highlights . . .

SO.902 RESEARCH PLANE

France's dark Sud-Ouest SO.902 (right) is a military research type for investigating some flight problems and also serves as a flying "test" for the proposed SO.903. See news item elsewhere. The MF 102 is a Dassault. Landing gear consists of three main wheels in flexible single shock absorber, and outrigger, all retractable. Sweep wings have skin. The SO.902 has attained a speed of 1000 km/hr (AVIATION WEEK, June 26) without experiencing compressibility difficulties.



TAT-VISCONDT MAKES DEBUT

First British plane to be powered by Rolls-Royce Tay is the first of two modified Vickers Viscounts (left) which has started flight tests. The installation was ordered by the Ministry of Supply to try out the Tay engine, which is a more powerful development of the Proteus. Thus far no after installation of the engine in British planes is contemplated, and indications are the engine will not be put into large-scale production.

BRISTOL 171 IN PRODUCTION

The Bristol 171 helicopter (right) is the first British-designed rotorcraft to go into production, although its use commercially is unlikely; main purpose will be in aerial surveys. It is a scaled-down version of the larger Bristol 173 twin-turboshaft design. Of the production models, one Model 171 will be used by Bristol European Airways for operational trials, and the others will be delivered to the Ministry of Supply for testing by the Aeronautics Forces Experimental Establishment at Farnborough.

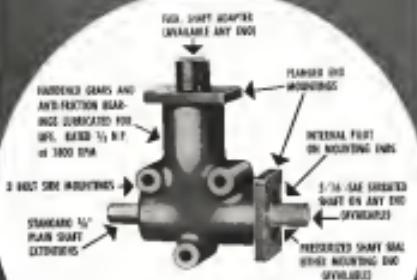


RAF FLYING CIRCUS

A trio of RAF Sidewinder R.G. helicopters (left) touched up by a skilled coloring artist to resemble the reversible padlock design complete with trunk, eyes and an open go through, then pass at the bottom of a carefully painted "ingress". They are rehearsing a short routine in preparation for the RAF Show at Farnborough this week. Is there anything a helicopter can't do?

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AVIATION CALENDAR

July 7-Bellied Air Force 1950 display, Pittsburgh, article, England.

July 10-12-Air Age Institute lecture series, Parks Air College, E. St. Louis, Ill.

July 12-14-Annual summer meeting of the Institute of Aeronautical Sciences, western section, Hotel Ambassador, Los Angeles.

July 14-16-National prints at merit, including a aircraft trading day, sponsored by Chattanooga Flyin Club, Chattanooga.

July 16-Third efficiency meet at show, sponsored by Aeroflot Aviation Club, Nov. 10-12, Moscow, U.S.S.R.

July 21-23-9th annual airshow at time, sponsored by Cleveland Junior Chamber of Commerce.

Aug. 2-4-17th National Soaring Contest, Grand Island, Tenn.

Aug. 2-4-10th annual meeting, Mont. 500 Warbird Airports, Goderich, Ontario, Canada.

Aug. 24-25-17th National Soaring Contest, Cambridge, Mass.

Aug. 25-26-First United States International Jet Meet, Chicago.

Aug. 25-10th annual air power conference, Louisville.

Aug. 25-28-California Air Flight, sponsored by Calif. Aerospace Council and Oakland Chamber of Commerce, Oakland, Calif.

Aug. 29-31-Fourth annual Air Force Annual symposium, Hotel Statler, Boston, Mass.

Sept. 5-11-Eleventh flying display and exhibition, Society of British Aircraft Constructors, Farnborough, article, England.

Sept. 5-6-Whitney Cup aerobatic competition, Seattle, Wash., and San Francisco, Calif.

Sept. 5-10-Third annual convention of the California Wing of the Air Force Association, Anaheim Springs Hotel and Spa, Anaheim, Calif.

Sept. 10-14-International Society of American Engineers, conference and technical session, the Coliseum, Houston, Tex.

Sept. 12-13-Conference on ground facilities for air transportation, Massachusetts Institute of Technology, Cambridge, Mass.

Sept. 13-15-Fifth national retirement conference and exhibit, Meadowbrook Inn, Buffalo, N.Y.

Sept. 13-15-16th annual convention of International Technical Aviation Council, Hotel Statler, New York City.

Oct. 11-13-19th conference on airport management and operations, MacWhorter Field, North Campus, University of Oklahoma, Norman, Okla.

Oct. 15-18-1950 annual general meeting of the International Air Transport Assn., Hotel Statler, San Francisco.

Oct. 25-27-10th annual air power conference, sponsored by aviation committee of Tulsa Chamber of Commerce.

PICTURE CREDITS

—McGraw-Hill World Service, McQuay-Watt World News, Keystone Pictures, D.P.P. Photo Co., —Blackburn & Sonnenfeld Air Photo Lab.

NEWS DIGEST

DOMESTIC

Howard Hughes' giant XBH-1 jet-powered seaplane took four hours on a nonstop flight from Calif. to Hawaii on Aug. 22 during ground trials of its T-38 test nose blisks. USAF has released no information on the cost of the accident or extent of damage.

The National Air Council transferred its quarters from New York to Washington, D. C., to facilitate its dealings with government agencies, industry, Congress and various associations. New address is Suite 513, Dupont Circle Building, 1316 Connecticut Ave. NW, Washington 6, D. C. Telephone number is North 2116.

Northwest Airlines Air Coach DC-4 crashed into Lake Michigan June 23, killing all 53 passengers and crew of three. It was the airline's worst air disaster. Plane captain's last report stated that the DC-4 had experienced a severe electrical storm and high winds velocity. The plane left New York and was en route to Minneapolis.

National Airlines is considering a daytime New York-Miami DC-6 with nonstop service at 45-minute mile intervals. It would complement present night DC-4 coach flights which have 60-minute stops.

Boeing's \$9,000,000 suit against the Aero Mechanics Union and International Assoc. of Machinists has been dismissed in Seattle federal district court. But the company will appeal to the U. S. Court of Appeals. Boeing added damages for the 140-day strike, estimated at \$1,000,000. At the time of the strike in 1945, both the union agreed with other rulings that although the strike was illegal, the company lost its right to sue when it concluded its contract with the union on the second day of the strike. IAM was held blameless since it did not tell the walked and still can sue the company for the strike until six days after it started.

W. H. Moss, British light aircraft designer and builder, was killed when the Mosquito he was piloting in the King's Cup Race crashed during a practice run. He was 45 years old.

Transair of Airline Transactions handled by the International Air Transport Assn. Clearing House during April was \$13,785,800, as contrast of over \$2 million compared with the same month last year. Quarterly transactions were \$50,000,000 for the first quarter of 1950 compared with \$46,371,000 for the same period in 1949.

Continued leasing of space at U. S. international airports for use by government agencies is planned. Under the new setup, the General Services Administration will handle much of our space clearing space at these terminals and arrange "single package" contracts with each airport.

Charles Lander Lawrence, aviation pioneer and inventor, died at his home in Meadow Park, L. I., N. Y., June 24. He was 68 years old. He was best known for the development of the first Wright Whirlwind engine. Lawrence headed Wright Aero Corp. from 1923 to 1928 and was up from 1928 to 1930. He then formed Lawrence Engineering and Research Corp. He was president of the National Chamber of Commerce in 1931 and 1932 and head of the Institute of Aeronautical Sciences in 1933-1934.

Second North American AF-1 attack bomber exploded in the air last week near Bedford, Va., killing all three crewmen. The plane, enroute from Edwards AFB (Majors) Calif. to Patuxent Naval Air Station, Md., on its first transcontinental test hop crashed in flames about 50 miles from the goal. The plane was powered by two Pratt & Whitney R-4360 34W engines and two Allison 35A turboprops. Details of crash are still unknown. A search nettop last evening destroyed the first AF-1 during a test flight on the West Coast.

INTERNATIONAL

U. S. Spanish air transport agreement has been amended to give Spain free trans-Atlantic routes from Spain to the Americas, Africa, Asia, India and Ceylon. Spain via Lebeda, the Azores, and Bermuda, and from Spain to Mexico, Hawaii, Caribbean and South American ports via Lebeda, the Azores and Bermuda. The U. S. has two routes through Spain.

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One Example: Shell's PLANNED UPGRADING of aircraft fuels and lubricants ...

PLANNED UPGRADING of fuels is shown in the new Shell 80-octane aviation fuel. This 80-octane fuel with a guaranteed minimum 10% margin rating of 85-octane was made available by Shell on a nation-wide basis in 1949. It is the fuel which has engine-manufacturer approval for many models in place of 95-octane.

Planned upgrading is also evident in the many Aerobell lubricants which meet the most exacting needs of modern aircraft. Such product superiority is the result of looking ahead, of anticipating needs, of continued research on a long-term basis.

*Write for us so we can tell you which 80-octane is recommended for specific engines.



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WHO'S WHERE

Changes

Charles French, chief engineer of East Air Lines, has replaced William Littlewood as a member of the Committee on Aviation of the Research and Development Board, Dept. of Defense. Littlewood, a engineer for American Airlines, resigned from the committee because of illness.

Averill E. Adams has been named sales manager of Douglas Aircraft Service, Woodside, N.Y., and Al Roselli has been appointed branch manager at Woodside. Louis Cesar, Howard Meyer has been made vice chairman of passenger, with John Boyle named as new head of the purchasing dept. at Woodside, N.Y.

W. W. (Ted) Stevens has joined Glenn L. Martin Co. as public relations staff. Earl F. Lapp has been appointed chief product manager of the Sperry Corp.'s Kaman Division, New Haven, Conn. Charles D. Pomeroy, formerly manager of test flight of the National Air Council, has been named executive vp of the organization.

Honors and Elections



IT'S NOW 'DOC' GRADMAN—Levi Elmer Gradman, chairman of General American Engineering Corp., twin half of his honorary degree of Doctor of Engineering from De Il S. Roger's College of Engineering Institute of Brooklyn (right).

Edmund T. Konow, engineering manager of the Washington division of further divisions has been promoted to Super of 36 Labor model of the American Society of Mechanical Engineers for "leadership in the development of the first American design of a large transport for civilian service."

I. W. Brumback, II, and Frederick F. Robinson have been elected to the Board of Govt Hydraulics.

Lennard S. Habstad, Northwest Airlines, has been elected chairman of the International Air Transport Ass'n financial committee.

INDUSTRY OBSERVER

Capital Airlines has obtained CAA approval on the installation in its DC-3s of Wright R-1820 G-212 engines in place of R-1820 G-210s without major rewards to the engine heater or carburetor, and without installation of cowls these. Elimination of the extra weight will save Capital more than \$500,000 over a three-year period, as the airline has awarded a small contract to Ralph Stowell, its engineer who is responsible for the change. Key to the approval is restriction of takeoff horsepower of the new engines to 1100 hp., but Capital, like other G-212 operators, obtains an additional 50 hp. at cruise settings.

The so-called "grass root" frequency for private pilots has restricted RTCA approved Special Committee 36 recently reported, however, that 122.5 m.c. is the only frequency available and some concern was expressed since most lightplane radios are calibrated only to 121.0. The committee pointed out that this latter was not too important due to the fact that while the radio dial shows 122.0 at high freq., the radio actually receives 121.8. While private interests strongly felt to get the channel to amateur use, FCC is expected to take a maximum of two months to clear frequency for general usage.

Definite steps to enter the world market with a transoceanic jet transport have been taken by A. V. Roe Canada, Ltd., Toronto. Leadoff in the campaign will be an advertising brochure in business and aviation publications in Canada, U.S., Europe, South America, Great Britain, Australia and New Zealand. Four advertisements as planned which will stress "more passengers-fewer enplanements," "superior passenger-related crews," "lower maintenance-higher profits," and "high service-quality-low maintenance."

First use of postwar non-American equipment as a scheduled Brazilian airline began this month with Viasul Aviao Sa Paulo S. A. (VASP) placing a SAAB "Scandia" in service on the Rio-Sao Paulo run. The Scandia (there have been only 10) will do the 250-mile run in nearly one hour. This cuts 40 minutes from the time now required by Douglas "Dakota" transports used by VASP and the half-dozen other lines flying Brazil's most remunerative route.

"Sweden" Gothic, Ethiopian Airlines, Inc., executive, is in the United States negotiating for purchase of two Convair Liners. Purchase is being arranged through Floyd Gilman's AllAfrica, Inc. Consolidated Vulco turned over 15 Convair-Liners to AllAfrica about two years ago and the Ethiopian sale represents the first business of AllAfrica. The Ethiopian line currently is flying six Douglas "Dakota" transports and one single-engine, Canadair-built, Norseman Mk. 5, on 48/53 route miles between Addis Ababa, Cairo, Nairobi, Aden, Bombay and Mombasa.

Central Airlines has made three major modifications to its fleet since its DC-3 in an effort to eliminate the possibility of inadvertent operating in flight (Aviation Week, Feb. 23) as has occurred at least twice. Recent consists of: installation of spring-type tail boom fairings and increases the effort required to raise hatch, reflecting of lever of engine fire, and mounting a rotary block to increase bearing surface between fairer and dome tail attachment points.

Australia is setting up an air industry for construction to let aircraft manufacturer, and plans an aircraft air force by end of 1953. Already in production with an order for 50 planes, is the de Havilland Vampire single-place Mk. 90 fighter-bomber. Plane is powered by Rolls-Royce Nene 4 developing 5000-lb thrust. Second plane scheduled for Australia production is the Hawker NJT-96. Also powered by a Nene 4, the plane is a single-place fighter designed primarily for shipboard operation.

While the French aircraft industry will continue developing prototypes and medium aircraft of all types, preliminary agreements reached between signs of the North Atlantic Pact are that France will concentrate its production of lighter types exclusively and will be responsible for developing interception tactics for Western European Defense.

Congress Straddles Issue on 70-Group AF

- USAF gets the legal right to operate 70 groups and supporting squadrons, but not the money.
- And chances of getting the money are slight as long as the President says we can't afford it.
- Result: No national policy to buy new planes every year, no safeguard against an obsolete force in 1953.

Advantages of an up-to-date Air Force and a robust, rapidly expanding aircraft manufacturing industry have offsetting political policy factors—but not on paper.

It comes as the House-Senate compromise version of legislation setting the statutory composition of USAF. A House-approved legislation authorizing USAF to procure 5200 aircraft (or 42,500 airframe man-hours) annually, the key in a modernized striking force and a healthy industry, was taken out of the measure. The conference committee—the House and Senate were expected to rechristen it—wasn't so positive, whatever the initial presentation of new aircraft.

Policy of Obsolescence—The world said that, as far as "the law" goes, there would be no national policy to keep USAF continually supplied with the latest equipment. It was assumed a world subscriber to a policy of USAF at obsolescent planes. The fact that 70 percent of the 70,000 aircraft in USAF's current active fleet were designated before 1940 shows that this has been the policy since the war's end and as well as the intended future policy.

Aircraft strength depends on the year-to-year appropriations for the air arm.

Legal Ceiling Set—The conference legislation agreed by the conference last week is simply a statutory declaration of national policy. It sets the "legal" ceiling of aircraft for USAF. Although a "paper" composition, it is an important one. With legal status, for example, it would carry more weight than such non-statutory paper recommendations as the reports of the President's Air Policy Commission and the Congressional Aviation Policy Board.

The measure outlined as an result of give-and-take between House conferees, led by Rep. Carl Vinson, chairman of the House Armed Services Committee, fitting in a strong USAF statute, and Senate conferees, led by Sen. Virgil Clegg, the Senate group tasked with the President's Budget Board, locking a statute federal down-

poner, the Army's authorized personnel strength is set at 837,000.

• **Transon Adams-McNerney**, despite testimony by the top military sources that the present USAF of 48 groups "widely exceeds" its power sufficient and logical, but wrong.

The President subsequently repeated to his press conference that the country, for lack of cash, could not and would not support a larger air arm. This, however, was before the start of the Korean conflict.

The legislation coincided with the completion of congressional action on legislation authorizing \$2 billion additional to the Commodity Credit Corp for purchase of surplus farm products. It also coincided with release of these statements before the Senate Appropriations Committee on the 1957 fiscal year defense budget:

• **Gen. Ernest Gruening, Chief of Staff**: "This Air Force [the 48 groups] is not big enough to fight." He could add, "I do wish that we had some more planes."

• **Gen. Hoyt Vandenberg, Chief of Air Staff**, agreed that the USAF is "scarcely ready." "We believe the number of groups we have is below the minimum level that we think is the minimum required."

• **Guided missiles**. USAF is explicitly authorized to develop and procure guided missiles. Senate conferees agreed to this in exchange for the House committee's strike out the provision for annual procurement of 5000 planes.

• **Commercial prototypes**. USAF is authorized from existing "in the design or development of commercial prototype aircraft primarily for commercial use."

This will, however, leave the door open for USAF to continue to purchase cutting-edge types of planes which were originally designed for commercial use.

Under the outgoing provisions of the Senate bill, aircraft manufacturers were apprehensive that this might be prohibited. Under the House bill, it would have been possible for USAF to engage in development of commercial prototypes adaptable for auxiliary military use, although USAF reported it had no intent of doing so.

Without such a reserve, the rate of apportion of Air Force combat units would be sharply reduced shortly after the beginning of hostilities and would progressively decline until such time as the aircraft industry could expand to an output sufficient to meet wartime losses.

That time is estimated at not less than 15 months.¹

• **Of the 13,000 aircraft in USAF's active fleet, 17 percent had their dragons laid before 1955.**

• **Another perspective** will be given in coming remarks by USAF on its "global" outside program. Future fighters at some stage will have much weapons as their principal armament." Sprawling far and wide.

• **Fighting fighters** are difficult in their ability to stop attacks of bombers, high speed, high-altitude bombers under condition of division as 3rd World War Strategic bomber. The latest major racing-engine fighters do not have the required performance, and the fighter-bomber fighters do not yet possess the radar intended to all weather operations.

• **Summary of Defense Loan Johnson** told Senate: "I used to emphasize that the research and development of the new planes will be started, in strength, and peace time." But the House, in the final 1957 fiscal year budget, stripped USAF \$500 million and Naval aviation \$74 million for research and development.

For the 1958 fiscal year, even with Transon Johnson's amendment of funds USAF had \$313 million (or \$5 million more) and Naval aviation, \$77 million (2 million more) readily available for research and development.

• **Vice Adm. John Price**, vice chief of Naval Operations for Air Warfare:

"For the past several years our annual level of expenditure in the research and development area has averaged with in excess of \$100 million. The level of new appropriations has been substantially lower than the level of expenditures, and, I think, we will now continue with the reduction of our spending except by treaty nations to get complete."

Basis for the plan is two-fold: 1. **Cost**, vital objection has been raised by treaty nations that while any nation may be equipped in defense, offensive and assault aircraft, such as Navy Hellcats and Hellcats delivered entirely under MDMP, would be little more than use less against an aggressor. This idea too has also been raised by the U.S. basis that obsolescence should be avoided by the use of aircraft which are simple and compact enough to be easily withdrawn from service by air strike and parachuting.

2. **Second**, vital concern to the Joint Chiefs of Staff is the fact that the total number of combat assault aircraft assigned to USAF and Navy has been on the decline since 1945. Despite increased numbers by groups such as the President's Air Policy Commission, Senator by recently appointed Air Secy T K. Flaherty's annual budget as decisions continue to chip funds away as power. Fiscal 1951 budget proposals did not even consider present personnel levels.

• **Basic Cited**—The critical decision arrived by the Joint Chiefs of Staff is the time when aggression would be met with models of sustained action against the nation is Jan. 1, 1964. The international issue however continues to widen, and Defense Department

Aid Plan May Triple Jet Output

Joint Chiefs favor newer fighters for North Atlantic Treaty nations; four types involved.

U.S. jet aircraft production will triple this year if a plan presented by the Joint Chiefs of Staff to give North Atlantic Treaty nations certain air requirements is approved by State and Defense Departments and upper congressional leaders.

Under the plan, more signatures of the treaty participating under Mutual Defense Assistance Program will be eligible to receive Lockheed F-104 Starfighter aircraft, 17,500, of which only 3240 are feasible combat aircraft. Navy has 13,500 aircraft on hand with early 2100 first-line combat types. Possessing of new aircraft in USAF's set of fiscal 1959 funds is pegged at 1250 planes and for the Navy at 390 planes.

Problem facing Congress, Defense and State Departments is how to bolster the air industry production of military planes without substantially increasing military air budgets. The aircraft industry in the United States, dependent upon military orders for more than 80 percent of its annual production, employs 300,000 in aircraft and engine manufacturing, 113,000 in precision manufacturing. That is more than 15 percent of those employed by the industry at the peak of World War II.

Aircraft Industries Association estimates that the industry's current production of approximately 1600 military aircraft per month could be tripled annually to approximately 450 combat planes per month by July 1, 1951, and to nearly 1500 planes per month in 1952. These statistics are valid only at adequate manpower can be found and their finance accomplished. And just as important, if machine tools and aircraft and engine components material are available.

• **Planes**—Fighting—Facing the situation and the military air expansion were suddenly voluntary in the majority of materials needed to produce today's fighters, electronic-equipped, jet-powered bombers and fighters. In March 1958, military backlog in aircraft amounted to \$2.9 billion. Of this amount, \$1.9 billion is for aircraft \$661 million for engines and \$97 million for propellers.

The Joint Chiefs' plan to provide treaty nations of the North Atlantic Pact with fast jets aircraft to fit possible increased strategic planning levels and increasing research is a common-sense approach all along the face of continued government and military services concerned.

It is anticipated, the shift commercially available air radios will be stabilized and able to start the climb to within the maximum safety limits of production capacity set for it by the Pan-

James Commandant early in 1948. **Four Types Considered**—So far, only the four types of jet fighter planes are under consideration for equipment of MADM's aircraft. If the program is adopted, then the first aircraft will probably be added to the lot at U.S. production aircraft in foreign service.

The Lockheed T-33A is armed with an 80-caliber machine gun and eight 140-mm. rockets. Span is 37 ft. 5 in. length, 16 ft. 9 in., height, 11 ft. 6 in.; weight, 11,000 lb.; empty weight, 8,930 lb.; loaded, 15,000 lb.; speed, 500 mph; ceiling, 41,000 ft.; range, 1,100 mi. F-86B fighters were ordered by USAF in 1947.

The Republic P-80D is armed with six 50-caliber machine guns and eight 140-mm. rockets. Span is 37 ft. 5 in. length, 16 ft. 9 in., height, 12 ft. 10 in.; weight, 9,555 lb.; loaded, 12,881 lb.; speed, 480 mph; ceiling, 47,000 ft.; range, 1,000 mi. F-80C fighters have been ordered by USAF.

The Canadair Vought FG-1 is armed with four 50-caliber machine guns. Span is 37 ft. 9 in. length, 33 ft. 7 in., height, 11 ft. 9 in.; empty weight is 12,697 lb.; max speed is 550 mi. hr. and range is 500 mi. h.

The North American P-82 is armed with six 50-caliber machine guns. Span is 38 ft. 10 in. length, 37 ft. 7 in., height, 14 ft. 6 in.; height, 14 ft. 6 in.; empty weight is 12,697 lb.; max speed is 550 mi. hr. and range is 500 mi. h.

The Defense Department remained silent on Cleveland's plan for military participation in next year's National Air Races.

paradigm has been the most driving card of the event, which though the years has assumed international importance. If Johnson fails to gain authority himself permission to fly it Cleveland's 19 Armed Forces Dog it might well open the end of the annual flight.

There has been a parlous lack of interest during the last three years on the part of the air industry as well as the military in the races. The danger of crashes of military aircraft performing at high speeds before crowds of thousands of onlookers has long been a headache to the industry concerned with keeping its product however in the public eye. The military, similarly, is skeptical of the value of public relations in the form and even more doubtful of the "training value."

Cleveland, meanwhile, announced a new race next year. The Bendix Trophy Race, a transcontinental race from coast to coast, and the Thompson Trophy Race, a speed dual around points, are to be continued to fit in next year. The Goettsch Trophy Race will remain open, he said, to light planes flying around points in view of the ground wind.

The Defense Department remained silent on Cleveland's plan for military participation in next year's National Air Races.

Northrop X-4 Ready For Transonic Test

An NACA test pilot will soon begin supersonic flight test probes into the relatively unknown transonic speed range of flight, piloting the Northrop X-4 research plane.

The pilot, John H. Griffiths, who flew 189 missions in USAF fighters in World War II, was recently assigned to conduct the interesting new research mission to take place at Edwards AFB, Marine Corps.

Possessing the starting list of qualifications, Capt. Charles E. Yengle, world's

first supersonic pilot (AVIATION WEEK Dec. 16, 1947), will do approximately 10 hours of special proficiency tests for the Air Force. The NACA pilot will then begin his experiments, equipped with data supplied by Capt. Yengle and Northrop test pilot Charles Taylor, former flight test chief.

The two supersonic X-4s are designed to fly the speed range around the 550-mph mark, just below the speed of sound at sea level to determine flight phenomena in that region.

Thus have 25 ft. wing spans, and are about 38 ft. long. Contains air intake, ram air scoop—concentration afterburn and elevators—and the planes have no horizontal stabilizers or elevators, only a vertical stabilizer and rudder. Power plants for each plane are two Wright J47-WE-13 engines of 3600 lb. thrust planned for the aircraft.

At Boyd, commanding officer at Edwards AFB, announced that the X-4 had completed their acceptance runs after 16 months of preliminary flying and other testing by Northrop crews.

Guided Missile Test Centers Realigned

In an attempt to pin down missile research and development costs (AVIATION WEEK April 26), Secretary Johnson has given his endorsement for the moved-around three major guided-missile test centers right back under the jurisdiction of a single source.

Under the order the Joint Long Range Proving Ground at Brooks AFB, Tex., became the "USAF Long Range Proving Ground Division." Originally it was planned for that test center to operate under the direction of the Joint Chiefs of Staff with the USAF as executive agent.

Holloman AFB, Alamogordo, N. M., is transferred to the Army which will be responsible for both the White Sands Proving Ground and the ad-



TE-8A IN FIRST FLIGHT

Replicated by an Allison J35-25 turbojet engine. Ground photo of the YF-8A appeared in AVIATION WEEK May 15 (p. 7).

AVIATION WEEK, July 8, 1950

Joint Holloman base. Navy will continue operations at Point Mugu, Calif.

Rationalization of management was had officially to "expanses of efficiency and economy."

Real purpose involved in the severer designation of command is twofold:

- To halt unnecessary bidding as to funding research.
- To determine which service actually research test center gets the most out of budgetary allocation of funds.

ATA Buys Flight Recorders for Tests

The Air Transport Association recently paid about 24 flight recorders for test purposes at a total cost of \$45,000.

General Electric, Hathaway and Carter Electronics, Inc., each supplied eight instruments. They are installed on aircraft of 16 airlines participating in the test.

The instruments are of the electrically driven, continuous recording type. They record altitude and vertical G acceleration. They are mounted in the tail of the aircraft where changes of attitude may be of a critical nature.

Al Dallas of ATA told AVIATION WEEK that the purpose of the tests is to determine the contrivance's reliability. The CAA does not now require the use of flight recorders.

ATA officials say Public Ownership, May 23, 1950.)

• It has brought into sharp focus the fact that the secretary retains to define what "a prevailing minimum wage" is, and that he often his determination as such elusive and vague language that he has to defend himself against charges of "arbitrary" determinations.

• Spirit and letter—According to the New York Times, the Secretary of Labor was in agreement with the idea that wages should be uniform across the country when he wrote the letter of the law.

Actually, the language of the Walsh-Healey Act is rigid in providing one minimum wage so no confusion is over mere broadening rather than the word "locality." In most determinations, the secretary bases his finding of the "maximum" on a rate of straight time hourly earnings for persons employed on (1) similar work, or (2) in the particular on (3) similar industries or (4) groups of industries primarily operating in the same city.

At last the second alternative seems to have been made by those charged with enforcing them. As far back as 1938, D. A. Shultzbeck, a member of the Public Contracts Board at the time, noted that alternatives 1, 3, and 4, were, respectively, "distant and widespread," "speculative," and "defeated in nearly all possible applications."

Rudolph Modley is President of Executive Research, Inc. A consultant at the Aircraft Industries Association since 1944, he helped prepare the industry's minimum wage case. He now is working on the minimum wage case of the office machine industry. Dr. Modley recently completed a two year assignment as special consultant to the Comptroller of the U.S. Air Force. He has been a Consultant of the War, Interior, and Agriculture Departments, the War Production Board, and other government agencies. He is a member of the Personnel and Labor Relations Committee of the National Management Council, and Industry Representatives on the Scientific Working Group of the Air Conditioning Contractors. The views expressed in this article are his own and should not be interpreted as those of any of the agencies with which he is connected.—Ed.

Minimum Wage: Industry Lesson

Deterioration for aircraft workers shows business the dangers of wage increases by administrative action.

By Rudolph Modley

The aircraft minimum wage case which led to the setting of \$160 in the minimum wage for the aircraft industry has given management a shock which promises to have consequences reaching far beyond that industry.

• It has compelled other industries to think of ways of attacking administrative decisions through the amendment of legislation.

• It has drawn much sharper than ever before the battle lines between the secretary on one side and industry on the other. Many industry representatives tend to identify labor's interests with that of the secretary. While that is generally correct, the following quotation from "a public release in defense of freedom of labor," shows the beginning of doubts in labor's rights on activities of unions as the secretary's "Labor does not claim to have the welfare of labor as its sole objective. . . . The function of government officials no matter how well intentioned they may purport to be" (APL Electrical Workers statement on Public Ownership, May 23, 1950).

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• Spirit and letter—According to the New York Times, the Secretary of Labor was in agreement with the idea that wages should be uniform across the country when he wrote the letter of the law.

Nobody has ever been able to figure out if the term "in the locality" was meant to apply to all pay structures or only to the big one. The "letter of the law" actually gives little or no guidance.

• Administration—The Labor department rules on the second alternative, the wages in the particular industry, as the only rule the one. Obviously a situation can arise where a company is going to need an application that it rarely finds more than three "available" in the entire United States.

In the administrative process the word "maximum" has undergone an even more astounding metamorphosis than the word "locality." In most determinations, the secretary bases his finding of the "maximum" on a rate of straight time hourly earnings for all workers, regardless of skill and advancement instead of considering instances like in the only true minimum wage—Mississippi Delta, for instance, where the basic rate is 40¢ per hour, which applies at the maximum of the rate range.

Workers who define minimum as "opposed to maximum," probably would have as hard a time in arguing before a minimum wage panel of lessening as industry does.

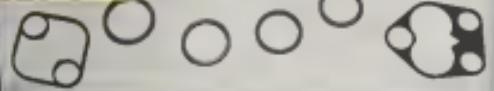
"Workers and the Secretary of Labor agree in their definition of the term

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AERONAUTICAL ENGINEERING

Aero Progress Challenges the Engineer

* In the last few years, the science of flight with its research and design ramifications has accelerated to such a startling pace that the remarkable progress of aeronautics' first decades pales by comparison.

* For the rank and file of aviation technicians and those entering the field, this new era presents a pointed challenge: To keep abreast of the rapidly accumulating knowledge so that new complexities can be resolved for sound application to practical design.

* Interdependence of groups in research and in design and the ever closer relation of these two activities means that the engineer must extend his knowledge into the field of his co-technician.

By C. E. Pappas*

The brief span of aerospace flight has added to the aeronautical engineer's "structure" a new set of complexities, with glaring gaps between what has been considered basic knowledge and concepts comparatively new to the field.

Aeronautical engineering has never been a "handbook" science. It will continue to present ever increasing challenges, testing the engineer's ingenuity and requiring a keen ability to apply newer knowledge to practical designs.

Since the field of aeronautics is ever changing—and fast—new knowledge is mandatory in its many directions. Chief among these are:

- Education
- Aviation
- Propulsions
- Structures
- Aerodynamics

The order in which these advances are mentioned, in no way diminishes their intrinsic importance, but rather they are the "building blocks" of what must be an integrated, overall structural and functional design.

►Education.—The aeronautical engineer frequently finds himself unable to cope with the newer concepts that high-speed flight has brought. This condition arises because basic training in mathematics, physics, chemistry and many other key branches are necessarily lacking to cover the ramifications of the majority of aeronautical problems.

This deficiency already has been noted in industry and there is no reason why the engineer will not be equally well aware of it.

►Aviation.—The general field of aeronautics, as applied to aircraft, has progressed so rapidly within the last decade that its advance has far outstripped the efforts of the average engineer to keep up with it.

This is a condition which can seriously affect design progress. It can no longer be ignored, because basic design of the aircraft is a fraction of the total problem of the electronic equipment and vice versa.

Hence, the aeronautical engineer must simultaneously contribute the contributions of the development of electronics equipment to the aerodynamic characteristics of the plane, to achieve greatest practical safety.

The engineer that designs present must have more than just superficial knowledge of electronics and its application potential.

Thus, high speed alone is becoming less for combat craft and aircraft equipment cannot be made to supplement this characteristic effectively. A pilot flying at high speed is confronted with a rate of climb as great, that he will be unable to place the target in his sights. Without equipment to give him ample advance warning, his speed advantage will prove of no practical value.

Also, electronics and basic design of maintenance controls must be tied together in such a manner that the designer can make full use of the advantages of electronics as well as mechanical systems in the high speed regime where instantaneous mechanical response of controls will be a prime factor. This will be necessary to cope with the requirements of highly refined devices as the possibility of safety problems.

Since the degree of complexity and ruggedness required for electronic equipment will depend upon the nature of the mission, the design engineer will need more than just a familiarity with these electronic devices to coordinate intelligently basic control problems with the avionic equipment.

►Propulsions.—At present—Does an aircraft require a large propulsive engine, or vice versa? This tends to be somewhat peculiar to aeronautics—a who testimonies for highlights at their full load in opposing empennage.

The engine designer took the sur-

rounds of the engineer will undoubtedly be a "vast" in the aeronautical future.

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The Lockheed Aircraft Corporation, largest producer of jet aircraft in the world, has built almost every jet airplane in all other U.S. manufacturers combined. In fact, Lockheed has built jets in the sum of more than one day—every day for more than five years.

Important members of the Lockheed jet family is the two-place T-33 Jet Trainer (shown here), only jet trainer airplane built in America today (Fort Worth, Texas). This dual control fighter-trainer now trains the pilots for the supersonic fighter planes of the Army, the Navy and the Marine Corps.

The experience obtained in the design, development and manufacture of jetplane planes is available in the Lockheed laboratory areas where the designs of the future are taking shape today.

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frame men by surprise when they added, about overnight, approximately 200-300 mph. to the speed of what already were considered "lost" military aircraft.

But it was not long before the air forces of the world commented. Increasing jet power with efficient and safe aircraft handling and wing configurations. Now, anyone observing the T-33 in flight can exclaim, "Look at what I have."

The aerodynamicists still feel the jet does not overtake the piston because of its lower (particularly at the higher wing load), specific fuel consumption, and many new characteristics.

All these items make the aircraft much larger than aerodynamically designed. This in turn, creates a need for still larger power, and here we go round in circles again.

Aerodynamics indicate that, if at a velocity of 60,000 ft. at a pressure of $M = 1.5$, static sea level rating of the engine would be of the order of 10,000 lb. thrust. This means tremendous drives to carry the necessary air flow.

The engine man may answer that they now have already compounded a jet engine of this power. They probably feel that the answer lies in a different type of powerplant—possibly a combination of jet and motor or possibly rocket power. Though this latter power wisdom has demonstrated its potential in research craft, much more must be learned about it operation and its fuel consumption required for combat service if its ability is to approach that of the engine in today's military craft.

While development of an "ideal" fuel could go far to hedge the aeronautic surface coverings, the engineer now envisions that a keener appreciation of engine problems is needed by the aerodynamicist and that the engine man must realize more fully the job less demanding the hypersonic plane designer.

For truly high speed designs, the knowledge of these two disciplines must be integrated by accepting only class leaders in the field of a single discipline, such as aircraft training in both fields. It seems to me that you approach must be the secondary answer.

► **Structures—New phenomena** are here to plague the structural analyst. These are not new problems, but well recognized special techniques and more refined mathematical approaches, not generally considered previously.

Example. The delta wing presents new difficulties in that the chord and span are of comparable dimensions, and as such, the interdependence of these

two-dimensional factors are no longer neglected.

And stress analysis is required to determine stress distributions at the most positive of a sweepback wing. The consequences of this are not known today. This has been discussed in experiments showing that stresses at the rear near root position can be even twice that at front spar.

Higher skin gases will require more exacting stress analysis. Here, the so-called aerodynamic effects, such as the classic induced effect by span and ribs and the reduction of these effects in delaying the general instability of the wing cause, must be considered for an accurate prediction of ultimate strength.

The structures is considerably different from the conventional thin skin structures whose overloading is not ended and the stresses remain relatively low by the increased areas such as spars and struts. While the buckling resistance of the covering must carry the primary shear and compression loading, and structural stability of the framework results in sudden and catastrophic collapse of the structure. Since supersonic aerodynamic heating will occur at future high speed craft at relatively low altitudes, we will have to appreciate the effects of temperature and time in the equation of structural equilibrium. Effects of temperature associated with those of tensile stress will produce a new phenomenon—thermomechanics—to plague the designer.

► **Aerodynamics—Transition, supersonic and hypersonic flight** will force the Padochians in these regimes do not lend themselves to conventional solutions found in the subsonic case.

In a long enough time-dependent and stability of the air flow shows no steady trend. This implies that the changes in motion as a function of Mach number are random in nature. The engineer should, therefore, accept knowledge to the fact that "wind ratios" cannot be used in this regime and hence he must give up the idea of precise determinations.

We must stand on a step of the non-dimensional ladder which is best described as "the ring of probability." A concept of statistical average for the roles to be used in studying the transient phenomena is naturally be one of the random motions that are involved.

The degree of randomness depends on a logic extent as the initial conditions at a given Mach number. For example, if an airplane were flying in level flight at, say $M = 10$, and accelerated to $M = 95$, the pilot would

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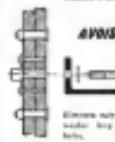
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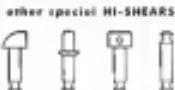


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cleaning is sufficiently fast.



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heat.



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experience on two reactions when he states at the end point of this report:

However, if the airfoil were to be disturbed from its initial equilibrium speed of $M = 3.0$ by exerting a solid, the pilot's reactions would not necessarily be the same when he attained a speed of $M = 9.5$ as at the level flight rate.

► **Physicist's Approach**—The notions of randomness and uncertainty are not new in other sciences. The modern physicist must admit of his problem that the scientist must make a hypothesis along the lines of statistical distribution and probability. He has given up the notion of trying to specify his quantities precisely.

The modern aerodynamicist should adopt that philosophy of the modern physicist.

► **Hypersonic Factors**—Problems can be given in hypersonic in which the aerodynamic engineer can no longer assume that the air is a continuum. This is because ultra-high speeds will be attained at very high altitudes where the mean free molecular path is comparable with the physical dimensions of the body which is flying through the atmosphere.

As such, the laws of aerodynamics that are now in current use are not applicable for the design of future high speed vehicles, particularly at the nose of the aircraft.

It is imperative for today's aerodynamicist engineer to realize that to keep abreast of the field he must acquire a knowledge of some of the work of the modern physicist.

Soil subjects such as aerodynamics and aeroelasticity must be understood.

unstricted. These subjects need to be unstricted. For example, before any catalogued answer can be obtained for the design of hypersonic transports. Since the tunnel pressure approach an absolute vacuum, this gas is reached. In this physical state, the ordinary thermo dynamic formulas do not apply.

And shock waves will require more critical analysis. The thickness of the shock wave is extremely small—of the order of the molecular free path. Inter-molecular distances are involved. Determination of the shock wave thickness does not apply. Molecular forces between rotational and vibrational degrees of freedom. Because of the extremely short time involved for molecules to traverse the wave, thermal equilibrium may not necessarily be observed.

The translational and rotational de-

grees of freedom approach equilibriums very quickly in passing through the wave.

The change in vibrational mode requires a finite time to attain vibrational equilibrium. This is known as the relaxation time. Allowance for that transition must be made in the energy equations when computing changes in position, density and entropy. This has not been used previously.

These departures from conventional aerodynamics indicate, as a small measure, how comprehensive in the field of aerodynamics have increased its scope.

New designs will involve application of many new concepts. And these new concepts will require a broader knowledge with the many facets of applied science.

Aeronautics is no longer a "specialist" study.



"TAFFY PULLER" SHAPES BOEING'S PARTS

Large rotary stretch former is new addition to Boeing Airplane Co.'s production line at Seattle. Fifty-ton machine has enough muscle to stretch aluminum or titanium sheet to its thinnest limit, then cover it with desired patterns. Extruded or rolled sections up to 22 ft long can be wrapped around the material as needed over several rolls. Boeing will use machine to make structural components. Builder is Cyril Roth Co.

Balsa Dust Shows Rotor Flow Geometry

Inexpensive apparatus is developed by NACA for helicopter research.

Balsa wood and a belt under light load cushioned by National Advisory Committee for Aeronautics to produce a new medium for the visualization of flow patterns around helicopter rotors.

Data, coded in a fine dust, provides highly reflective particles of low mass which can be introduced into an air stream for airflow observation. The technique, and its applications, was presented in a paper by M. K. Taylor of Langley Research Laboratory at the semi-annual meeting of the American Society of Mechanical Engineers in St. Louis, Mo.

After testing with a number of materials, including polyester, including wood, NACA found that finely-divided balsa particles gave the best combination of high reflectivity and low mass.

Balsa dust has a very precise background. It is free of a root-mean-square of about one μ in size.

► **Simple Apparatus**—The apparatus required for balsa dust flow visualization experiments is the dust, a camera, photographic lamp and some sort of dispensor for the dust.

The NACA dispenser is a narrow trough with a serrated bottom. Filled with balsa dust. The trough is mounted about four feet above the plane of the rotor, and is rotated continuously to disperse the dust.

A plane of high intensity light beam a number of photographic spotlights is projected normal to the line of sight of either a still camera or a motion picture camera. The cameras, of course, are used to record the flow patterns.

► **Rotor Details**—The model rotor tested in the group of experiments was single model consisting of a cross section of ledger's practice. An outer dia of the cam involved, the central web was 16 in. in diameter, and the blade armature, 45 in.

Plane of the static vanes about five ft above the floor. For simulated ground effect, ground planes were set at either 25 percent or 50 percent of the static diameter below the rotor plane.

► **Test At Rotational Speeds**—then, the NACA's dust method has been used to determine the flow geometry around model helicopter rotors in the three-bladed, rigid, square condition of both steady and transient flow.



BALSA DUST and floodlights define flow pattern around rotor in presence of simulated ground 0.25D below. NACA flow visualization.



Method shows static chord geometry of rotor wake and trailing vortices from blade tips at initial time. Balsa particle view.



FLOW GEOMETRY resulting from rapid shear across a model rotor showing wake pattern due to balsa dust.

It has been possible to make measurements of the wake balsa mass, in steady and transient flow conditions, to assess the effect of the ground plane on flow patterns. And it has all been done with a simple technique and inexpensive apparatus.

Britain's Freighter Queen Makes Debut

Design is conventional, gross is 105,000 lbs., landing gear fixed.

Britain's top entry in the cargo air craft field, the Universal Freighter built by Blackburn & Cossor Aircraft Co. Ltd has taken to the air for the first time.

The bushy craft is intended to fit the role of the standard, medium-pay load, short-haul cargo plane of the British air fleet.

► **Fast Response.** The Universal's configuration will generally follow that of the Cessna and Norwell freighters that country, although it is much larger. It has an extension with three ailerons, truck-like fairings fitted with a landing ramp under the nose.

The Universal is Britain's first designed for the purpose all-cargo plane of any air size. Its 105,000-lb. gross weight is twice that of the Bristol Freighter.

This weight, coupled with a 152-ft. wing span, makes the Universal the second largest British landplane, exceeded only by the Bristol Britannia eight-engine aircraft.

Design of the Universal is based on the need for a 170-225 mph craft which can carry up to 15 tons of cargo (21 ton useful load) at low cost over relatively short distances and get in and out of fairly tight places.

While the Universal is Britain's largest air freighter, it is small compared to the largest American cargo plane, the Consolidated Valiant XC-99 which, with a 205,000-lb. gross weight and 230-ft. wing span, can carry a useful load of 65 tons over great distances at speeds exceeding 300 mph.

At least twice since U.S. aircrafts primarily designed to carry cargo, the Douglas Globemaster and Boeing Stratoliner, are well ahead of the Universal in speed, payload and range.

► **Bush Freighters.** However, it is possible the Universal may prove to have some advantages in cargo loading ability. It also ranks nicely for the classification of "bush freighter" with its short landing and takeoff ability. And it has been designed to operate even from two fields. Bristol has to clear a 50-ft. obstacle at 1,000 ft. less than 3000 ft. It is supposed to land over a 90-ft. obstacle, a little more than 3000 ft.

► **Mr. Universal.** U.S. thinking on cargo planes seems to require two types—the long-haul, long-range type and a short-haul, low-pay load type. The British have the short-haul type on the Bristol Freight. But the Universal is a new class—a medium payload, short-



UNIVERSAL FREIGHTER'S sprung air load has integral ramp. With ramp down . . .



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load plane—an between the two extremes mentioned by the U.S. market.

The Universal's interior maximum payload at a load modulus load between trucklike sections and points served by the main cargo craft is 105,000 lbs.

► **Load and Range.** As estimated, according to the SHAC Standard Method, the Universal will carry a payload of 14.4 tons 230 mi. at a cost of about 12 cent/mile, 13.5 tons 500 mi. at 11 cent/mile, 10.83 tons 1000 mi. at 12.4 cent/mile, and 7.75 tons 1750 mi. at 17.4 cent/mile.

Landing areas on the craft are the same cargo held, taking up the entire center section of the fuselage, a smaller compartment in the nose, below the cockpit, and additional space in the tail boom, to the rear and above the main hold.

The main hold is 36 ft. long, 10 ft.

wide, 10 ft. high. For the first 2 ft. from the forward end, with the rear section of the main hold. This arrangement gives an upper compartment of 1810 cu. ft. which will carry a maximum of 30 passengers.

► **Doorway Conversion.** The Universal can be converted into a 90-passenger transport by adding seats for 60 persons in the main hold three on one side, two on the other, to the main cargo area in the rear compartment.

Passenger access to the upper deck is provided by a staircase at the forward end of the lower deck (main hold).

Freighter Data

Dimensions

Span	162 ft.
Length	99 ft. 2 in.
Height	33 ft.
Wing area	2160 sq. ft.
Aspect ratio	2.441
Wing loading	534 lbs./sq. ft.
Wing deflection	±15 deg.
Incidence	5 deg.

Weights

Gross	105,000 lbs.
Useful load	41,000 lbs.
Gross weight	141,000 lbs.
Maximum landing weight	120,000 lbs.
Wing loading	534 lbs./sq. ft.

Performance

Trip speed	65-125 ft./sec.
Rate	215 mph.
Max. continuous cruise speed	at 12,000 ft.
Max. economic cruise at	12,500 ft.
Recommended cruise, best engines out	119 mph.
Rate of climb	620 ft./min.
Service speed, Rugs up	100 mph.
Takeoff distance to clear 10 ft. obstacles	700 ft.
Landing distance to clear 10 ft. obstacles, reversible propellers	700 ft.
Service ceiling, approximate	26,000 ft.

Capacity

Total cargo volume	1150 cu. ft.
Total passenger capacity	—

cargo compartment directly below. Give access to the ladder from the outside through a lower door on the left side which opens into the forward cargo compartment.

Except for engine gages mounted on the outer starboard panel, aisle wheel steering pedals on the left side, and controls on the center console, all controls and instruments are duplicated for the pilot and co-pilot. Anti-pilfer controls and anti-theft landing equipment are duplicated on the center console.

Normally, steering is done with the aisle-wheel steering pedals while controls are on the ladder. When ladder is retracted, both pedals cannot be operated all together beyond the turning point, but they can be operated singly or in pairs, to maneuver the plane.

► **Control Surfaces.** While elevator, aileron and rudder trim tabs located on the outer starboard panel, wheels located aboard of each seat, elevators can also be lowered singly by electric pushbutton on the "V" shaped control column handles.

All flight controls are hydraulically boosted with only a small part of the load transmitted to the pilot. The boost ratio is reported to be as high as 16-1. Seats are arranged for forward sevens, two up in 25 in.

In the ship compartments, separated from the cargo bay by a bulkhead and service entrance, the rear section contains an aisle back-to-back, as a double seat on the left side with a rest box opposite. The navigator's station is designed to provide for installation of cloud and collision warning radar equipment.

► **Wing Structure.** The modified RAF 34 wing is built in four parts, two center sections raising power plants, four fuel bays of 700 U.S. gal. capacity each, and flaps, and two outer panels carrying ailerons and designed to prevent side-torsional oscillation of two bad bags in the wing.

A front spar is located at 25 percent chord and a rear spar at 55 percent.

Conventional construction is used with skin stiffened around the front spar. Skin is reinforced here by a corrugated wear skin, while closely spaced struts and ribbed webs are used at the front spar. Majority of the skin are the pressed flange type.

► **Stabilized Flaps.** The two 191-lb.-NACA slotted flaps have a total area of 402 sq. ft. and are operated electrically. They are symmetrical and are moved by a total of 6 actuators, each capable of moving a load of 36,000 lb. The center actuator for each flap is directly driven by a 1-hp motor with the one on each side linked to the center unit by torque shafts.

► **No Roll Recovery.** The nose landing gear on the Universal is non-retractable. Main wheels are steered by means of

legs attached to the undersides of the wing. These legs are braced by stretch extending from the tail of the landing gear at the bottom. The nose wheel is a center through 120 deg. and turned by means of a Lockheed hydraulic steering unit which is powered by the craft's 2300 hp system. It is actuated by a cable system controlled by a pedal located on the left side of the cockpit.

The Universal is powered by 4 Bristol Hercules 701 engines driving 14-ft. dia Rotol four-bladed, reversible pitch propellers. Engines are rated at 2000 hp at 1800 rpm.

Landing Gear Fires Studied by CAA

A study to develop more exact data on landing gear fires and to establish the heat conditions for handling these was undertaken recently by the Civil Aviation Administration Technical Development and Evaluation Center, Indianapolis.

It is the practice of some pilots, when confronted with such an emergency, to apply prop blast after the plane has come to a stop to extinguish the flame until ground fire-extinguishing equipment can be brought into play. ► **How Much Blast?** Little has been known, however, about the air flow speed required for most effective results, how long prop blast can be safely used, and what other factors are involved—if any.

To find out, CAA set up a complete DC-3 landing gear on the fire test chamber at the Center, where the aircraft had been completely gutted. With 1 percent nitrocellulose fuel, the investigators began their study by applying prop blast.

The Pratt & Whitney R-1830, rating 1610 h.p. at 2600 rpm, furnished the air blast for tests. A spark ignited by electric fuel droplets under 900 psi pressure at a rate of 8 gals/min. a spray nozzle. The landing gear was located 11 ft. 6 in. aft of the prop and 21 in. to left of the centerline of the XM-81 fuselage.

The investigation was divided into three parts:

- **Atmospheric measurements adjacent to the landing gear.**
- **Study of fire patterns in connection with fire flow.**
- **Study of the durability of a burning gear.**
- **Measuring Air Flow.** The apparatus for measuring airflow at various points in the same place as the heat incident of a burning basket extending out ward from the strut, to which were attached copper tubes for measuring air flow. The basket could be raised to the full height of the strut. The tube ends were spaced at selected points out ward and were pointed upstream to avoid total head pressure. They were

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connected to a multiple water ramone for which was balanced against static air pressure in the test chamber.

At low readings, the test was taken at each 6-in. level, from a height above the floor corresponding to the center line of the landing gear wheel to the full exposed height of the steel.

It was found that high speed air flowing the propeller would operate like a momentum cylinder having a slightly larger diameter than the prop. Outside the bounds of this cylinder, the air speed is relatively low and in some areas reversed.

► Flying Line—On completion of the air-speed survey, another series of test was conducted in which fire were ignited in various locations along the length of the aircraft. When the first of the particulate point under observation appeared to be under control, the air speed was noted. Flames were considered to be under control when they were reduced to a size that prevented damage to surrounding structures. (A "controlled" fire looks like a large ball attached to the lower end of a pipe, says one test.)

Airspeed required to control these fires ranged around 60 to 80 mph. The fire generally could be blown out when engine speed was increased to 1800 rpm (145 mph airflow speed at the prop).

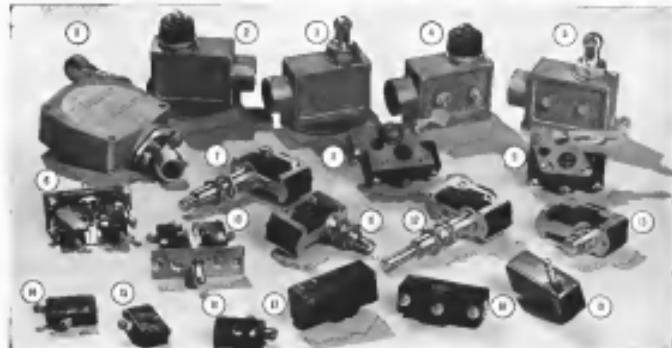
► Tire Test—To determine how long an inflated tire could be subjected to this heat and remain intact, a wheel equipped with a tire and tube inflated to 45 psi was set in an upright position on the concrete base. The same hydraulic spray nozzle used in previous test was situated at the center of the wheel. After the fire was ignited, the nozzle was sprayed, the flame impinged on the tire, passed through holes near the center of the wheel, and enveloped nearly half the tire.

No air blast was used in this test, but a 15 mph wind which was blowing at the time performed a similar function. The tire remained intact for 2 min. 16 sec. Failure occurred near the head of the tire and was accompanied by a deaf site explosion.

As a result of these tests, GAA engineers have concluded:

- Average tire air speed required to control burning gear is about 70 mph.
- Airspeed of 70 mph is easily obtainable with prop located directly ahead of landing gear.
- Fires can be blown out conveniently by a very strong blast of air.
- Size of tire determines length of time a burning tire can remain intact, but it can be expected to sustain witness 2 to 3 minutes.
- It is highly dangerous for ground personnel to approach any object less than 25 ft. to a burning tire prior to the time it explodes.

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4 Lightweight, rugged, aluminum-housed switch with sealed plunger (MICRO 847-17-71761), six terminal design, conforms to AN/SEL-2.

5 Aluminum-housed switch (MICRO 847-17-71761) with self aligning roller assembly, six terminal design, conforms to AN/SEL-2.

6 Monolithic precision pressure single pole switch assembly for ultrasonically operating and sealing instruments (MICRO 847-17-71761), four terminal design, conforms to AN/SEL-2.

7 Actuator bracket (MICRO 847-17-71761) performance to AN/SEL-2. For use with single pole double throw basic switch (MICRO 847-17-71761) which conforms to AN/SEL-1 or with open frame three pole three throw switch (MICRO 847-17-71761).

8 Lever arm actuator bracket that has provision for restraining the lever switch while actuating arm is depressed (MICRO 9-17162-1). Conforms to AN/SEL-2. Right-hand design (MICRO 9-17162-1R) and left-hand design (MICRO 9-17162-1L) are available. For use with MICRO lever switch (MICRO 847-17-71761), which conforms to AN/SEL-1 and AN/SEL-2, respectively.

9 Roller lever actuator bracket (MICRO 847-17-71761) conforms to AN/SEL-2. For use with single pole three throw basic switch (MICRO 847-17-71761) which conforms to AN/SEL-1 or with single contact double three switch (MICRO 847-17-71761) which conforms to AN/SEL-2.

10 Monolithic precision pressure single pole switch assembly for ultrasonically operating and sealing instruments (MICRO 847-17-71761). For use with single pole double throw switch assembly in AN/SEL-2 (MICRO 847-17-71761). The MICRO 847-17-71761 which conforms to AN/SEL-2.

11 Micro switch (MICRO 847-17-71761) performance to AN/SEL-2. For use with MICRO single pole double three throw switch (MICRO 847-17-71761) and with MICRO single pole double three throw switch (MICRO 847-17-71761).

12 Actuator bracket (MICRO 847-17-71761) conforms to AN/SEL-2. For use with MICRO single pole double three throw switch (MICRO 847-17-71761) and with MICRO single pole double three throw switch (MICRO 847-17-71761).

13 Small, compact MICRO VE-21 normally-open switch conforms to AN/SEL-2.

14 Small, compact MICRO VE-21 normally-open switch conforms to AN/SEL-2.

single contact double three switch (MICRO 847-17-71761) which conforms to AN/SEL-2.

15 Monolithic precision pressure single pole switch assembly for ultrasonically operating and sealing instruments (MICRO 847-17-71761). For use with single pole double three throw switch assembly in AN/SEL-2 (MICRO 847-17-71761). The MICRO 847-17-71761 which conforms to AN/SEL-2.

16 Micro switch (MICRO 847-17-71761) performance to AN/SEL-2. For use with MICRO single pole double three throw switch (MICRO 847-17-71761) and with MICRO single pole double three throw switch (MICRO 847-17-71761).

17 Actuator bracket (MICRO 847-17-71761) performance to AN/SEL-2. Designed for use with MICRO single pole double three throw switch (MICRO 847-17-71761), which conforms to AN/SEL-2. For use with MICRO single pole double three throw switch (MICRO 847-17-71761), which conforms to AN/SEL-2.

18 Small, compact MICRO VE-21 normally-open switch conforms to AN/SEL-2.

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28 Small, compact MICRO VE-21 normally-open switch conforms to AN/SEL-2.

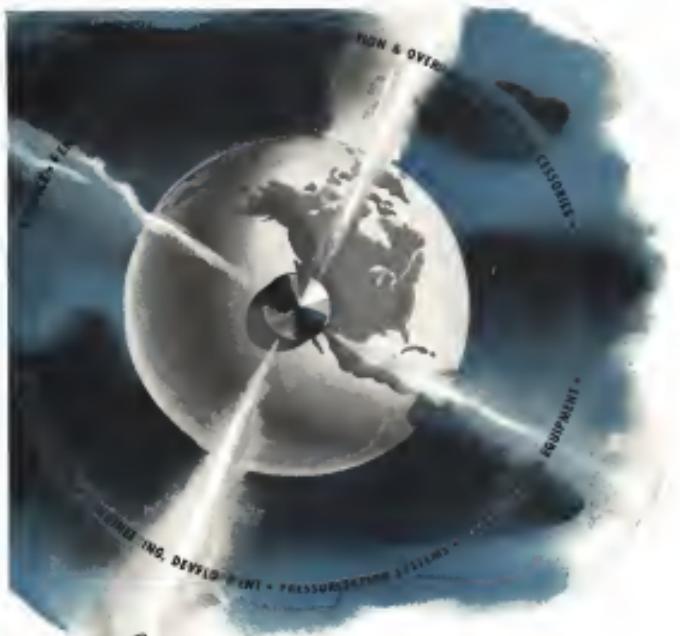
29 Small, compact MICRO VE-21 normally-open switch conforms to AN/SEL-2.

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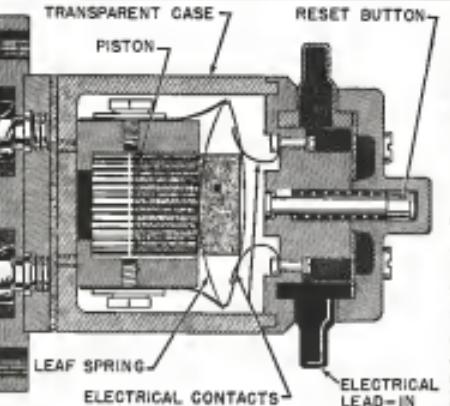
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EQUIPMENT



SWITCH is actuated by piston. When piston moves forward (arrow shows it may be urged by spring to bridge electrical contacts) its coil position, spring is forced back.

Simplified Crash Fire Switch

U. S. market now being offered new design of device long used in Britain to activate fire prevention systems.

Several major airlines and engineers of the Civil Aviation Authority are evaluating a new fire prevention crash switch being readied for production by Stevens Aircrafts, Inc., Tarrytown, N. Y.

The new switch features the latest improvements in crash switch design. It was developed by the world's leading producer of this type equipment, Genvair Mfg. Co., Ltd., England. Stevens has obtained sole rights to produce these units in the United States.

These crash switches, now standard equipment in British military and commercial aircraft, will be first made that is more reliable. Because each of the model with programming plates has been tested to destruction, a plane has been better than this country's.

► New Design.—The new switch differs considerably from previous models not built by Genvair. A major change is that the pendulum unit used up to now to

close switch contacts at impact, has been replaced by a piston-controlled mechanism. The device is set to operate automatically at a longitudinal or frame deceleration of 1 G, or more, but can be adjusted to any desired setting.

Stevens says it is accurate in ± 0.15 G. In general design, of the new unit appears to be more compact, forward, compact and simpler than that of its predecessor.

At crash impact, it will electrically activate fire extinguishing equipment, fuel cut-off valves, battery cut-off switches, signaling devices and other equipment mounted in such an arrangement.

► How It Works.—In this switch the activating piston normally is held in the reset position by a leaf spring. As deceleration of 3 G or more, however, the weighted piston overcomes the holding effect of the leaf spring, causing the spring to snap forward and bridge a

set of electric contact points to operate suspended circuits.

Reset button and electrical connections are readily accessible by removing a sealed cover at the front end of the switch. Pressing the button resets the steel spring and returns the piston. Pressure of the spring and piston can be determined visually, the body of the switch being transparent.

The design eliminates protrusions from the front cover to facilitate electrical connections. The 11-in. unit is 16 in. long and is provided with a 2-in. square pad across producing four 6-in. mounting holes. ► Other Switches.—Stevens is not the first company in the U. S. to produce switches based on Genvair patents. Walter Kidde & Co., Inc., Belleville, N. J., has turned out thousands of pushbutton-type master switches for aircraft, detecting circuits to detect IFF code transmitted in a craft.

A different approach to crash switch design is a recent development of English Electric, London, Ltd. This is a "bullet" switch which consists essentially of a small glass cylinder containing a cause mechanism and suitable electrical connections.

This switch is attached externally to the aircraft skin so that it flexes and completes the crash circuit when skin deflection on the skin is greater than normally encountered.

While Britain has enthusiastically endorsed the crash switch to the extent of making its installation in aircraft mandatory, U. S. carriers have taken a decidedly more cautious approach.

Three factors apparently influence this attitude:

- A fear that crash switches might trip at the wrong time.
- The view that crash fast fail will cut down significantly only by blocking false causes far through changes in switch design.
- Usefulness of a crash switch dependent in proportion to the effectiveness of the fire extinguishing system.

In answer to fears that these switches may operate at the wrong time, Jerome Lederer, director of the Flight Safety Foundation, told *Airways Week* that his group has received no reports from the British air piracy section of crash switches. He considered one example of this type may not have been operated.

Kidde says it has heard of an case where IFF code has been inadvertently transmitted since 1944, but there were several such incidents at the early stages of the war when similar switches had been used with this equipment.

► Good For Now—It will take time to recover strength impaired during base camp fire. The certain view appears to be that the crash switch area will prove effective for extinguishing equipment is a step in the right direction, even if the long way, since an avionics engineer that problem probably will depend on the use of highly creative, and automatically-controlled crash systems—now based with improved aircraft design.

While safety experts generally feel that methyl bromide (CB) is the best extinguisher system for aircraft interiors and wings, than CO₂ equipment used by U.S. carriers, important point out that methyl bromide has the disadvantage of being highly toxic and explosive in its normal state.

CB (CH₂Br) fire extinguishers, developed by the General and exclusively tested by the Air Force, CO₂ and Koda, reportedly has the superior fire extinguishing qualities of methyl bromide, but is considerably less toxic and somewhat less expensive. Further, CB can be used in the same Koda equipment now used for methyl bromide.

Military planes equipped with methyl bromide, the C-130, the T-38, B-52, F-105, and the C-135, the CO₂ and CO₂/SA-164, F-101 Black, Warhawk and the JRM Mars flying boat had during the war also were similarly equipped.

The Air Force has issued a specification on CB, and the entire AF aircraft fire extinguishing specification will be revised shortly to permit use of CB only. The Navy, on the other hand, will continue use of methyl bromide pending further investigation. Major producer of CB is Dow Chemical Co., Midland, Mich., and Michigan Chemical Corp., St. Louis, Mo.

Koda says its methyl bromide (or CB) system could be used effectively for maximum crash fire protection if crash switches were installed.

► British Expressways passenger bit of evidence in favor of automatic crash systems in Britain's expressways issued since the end of the year. Out of 34 four-lane civil plane crashes 30 were not followed by fire. A qualitative study in this country indicates that if these were U.S. transports, crashes that are at 99 percent would have caught fire.

Information on what part, Genève, carries certain design with methyl bromide systems played to determine the British crash record will be needed.

In this connection, CAB is expected on August 15th to submit a final report on a proposed recommended test that crash earlier and harder of all new transports be provided with automatically operated crash fire protection, to be released at a predeetermined declared time.

► UAL—World—United Air Lines already has developed an earth switch of its

own—but not for fire protection. This switch is designed to turn on floodlights located in the plane to indicate emergency passage and exit points in a crash. The unit is used with conventional right-angle floodlights mounted in special brackets. Each light has its own remote switch, adjusted to trip at a distance of 1 1/2 G and designed to be reset. All that is required to adapt this device to a floodlight is to remove the bottom two mounting holes and screw in the new one in its place.

With the new remote switch patches apparently forthcoming hopefully for the British, the trend toward adopting these units for crash fire protection seems to be getting stronger. U.S. air lines are beginning to give more and more study to the crash switch.

NEW PRODUCTS DIGEST



Weather Aids

Line of new port indicators for airports, airport and laboratory use have been developed by Cook Research Laboratories, 1415 Elmhurst Rd., Chicago 14. [3]



Lightweight Motor

A small 1/10 hp. motor produced by Minnetonka Electric Mfg. Co., 152 W. Calanda St., Franklin, Calif., has an efficiency rating of 70 percent and weighs 4 oz.

Unit is designed to conform to Air Force Specification 12390. It operates on 115V, 60Hz, 90% current. Motor has diameter of 2 in and length of 1 1/2 in. Power ratings up to 1 hp. are available in the same frame diameter, unless says.

turn only and gives for 8 hours without refilling.

All these units operate on 110V, 60 Hz current, have a sequence of 50/60 Hz. Temperature range for D-1 and -3 sub series is -50°C to 40°C, while range for D-1 is -30°C to 40°C.



AIR TRANSPORT



FIFTH TRANSCONTINENTAL ROUTE, this one for EALs, is recommended by a CAB committee to link Miami and the West Coast.

EAL a Step Nearer in Coast-to-Coast Bid

Examiner recommends routes be pushed west from San Antonio with restrictions to protect existing lines.

Eastern Air Lines will become the fifth transcontinental carrier in April, says Cox, Attorney, Boston, follow his recommendations on six routes.

In his report on southern routes to the West, Examiner J. Bert Cox has suggested that EAL's routes be extended from San Antonio to San Francisco, Oakland via El Paso, Tucson, Phoenix, San Diego and Los Angeles. He also recommended that the American Airlines-Delta-Twa Los Angeles equipment inter-change, which will provide one-plane service between the southeastern states and the West Coast, be approved on a permanent basis.

The proposed new links would add 2735 miles miles to EAL's system, making it about as large as United's. But most of the nation's carriers already have a larger domestic system than the four transcontinental haulers Northwest and TWA. Eastern would need about three additional Comairlines to service the new routes.

Cox called for denial of American's bid for new routes between Latin America and San Francisco, however. The Pan American, Houston, New Orleans, San Antonio, Houston, and New Orleans, and between Dallas, Houston and New Orleans. He also urged cancellation of Detroit, Cincinnati, Delta and National for New Orleans-California links.

► Better Service Needed—The examiner said the public convenience and necessity require establishment of basic service with southern cities in Miami, New Orleans, Houston and San Antonio to California. He emphasized, however, that Eastern should not be permitted to engage in unrestricted competition with American, TWA and United on the New York-West Coast market. The report suggests salvaging the present routes and continuing them.

With these new extensions, Eastern would be 194 miles longer than a transcontinental run via Chicago and could afford an comparable intermediate traffic protecting post. Cox said.

But he said that the impact of EAL's New York-California competition would not be felt until Eastern's new routes begin flights between the West Coast and Richmond, Va., or points north thereof (Boston, New York, Philadelphia, Washington, etc.), he expected to serve at least three points between El Paso and Richmond.

► Division Far and Comair and his proposed restrictions should prevent EAL from encroaching on the transcontinental potential of American, TWA and United. "It was with such limitations, Eastern could attract any large share of New York-California business; it would be a reflection on the adequacy of the services offered by the other three major carriers," he added.

American, which has the largest share in EAL's transcontinental competition, estimated it would be reduced to 575,178,000 worth of annual traffic if the new routes were given CAB's EW's set a possible diversion, holding \$15,574,000 and United \$10,779,000.

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Ninety-five percent of Eastern's new through traffic would be diverted from other carriers, according to American. But Cox cautions that in view of his present contract with EAL, Eastern wouldn't. He says they're prepared to meet possible diversions based on the assumption that EAL would compete for and effectively for transcontinental traffic from the Northeast to the West Coast.

Besides the restrictions on EAL's through transcontinental service, Cox would protect competing carriers by preventing Eastern from operating shuttle trips between San Diego, Los Angeles and San Francisco and by having service to El Paso and San Antonio on the same flights.

No Subsidy Help. The carrier's report asserts that Eastern's financial position would be considerably improved without increased cost in the form of pay to EAL at any other center affected by the new route. Eastern President E. V. Radlo basketed, is seeking the new link, offered to operate it without any subsidy and pay.

Cox said competition between EAL's new transcontinental service and the American-Delta DC-6 interchange at Ft. Worth/Dallas should insure a high level of efficiency and public service by both operators. The AA Delta interchange was inaugurated last September after temporary base peaking CAB's demand for the southern transcontinental route was met.

Interchange Disadvantage. The report shows a marked lack of enthusiasm for equipment interchanges as a means of providing later and more convenient airline transportation. This, Cox believes, is particularly true where major deficits in capacity are involved—or the southern transcontinental run CAB members will study first place of the impact closely since, during recent years, they have expressed hope that interchange could keep new distance route assignments to a minimum.

Eastern's plan to start operations would be conducted initially with Conairflock. Suggested schedule call for five roundtrips daily to the West, three of which would originate in Miami and two in New York.

Domestic Traffic Up But Earnings Down

The 16 selected domestic load-carrying airlines had traffic records during the first half of 1959, but earnings during much of the period fell below the 1959 level.

While load data for May and June are not available, it is apparent that domestic airline passenger and cargo

business in those two months was nothing short or spectacular in most cases, although led by switch around for enough equipment to handle peak period loads, and passenger savings lists remained.

Cost of a Northeast Airlines DC-4 as coach in Lake Michigan from June 24 did not have obvious nationwide effects on the traffic level, although some loss of business from cities in areas closest to the accident was considered inevitable. One carrier reported a few passengers delaying their reservations with an AA coach to replace flights after cancellation of the accident.

During the first quarter of 1959, passenger tonnage went up 7.7 percent over the same period in 1949. The gain was nearly 11 percent. The best results, especially on the transcontinental transients, are expected when all figures are in for May and June.

World Broad Set.—American Airlines during May looks all records for the number of passenger miles flown in one month by a single carrier, besting its own mark of 11, June, 1949. AA's passenger mileage rose 12.3 percent over the same month last year, and its load factor was 68.1 percent.

The carrier's May freight tonnage

upped 27.7 percent above of May, 1949, compared to 21.4 percent over the same period in 1948. American's transcontinental freight service operated at 90.1 percent of capacity during the month, carrying 625,000 packages.

American, United and TWA all reported record traffic during the first three weeks of June.

United and passenger business on June 18 was the best in its history. TWA's transcontinental passenger traffic from June 18-19 was 11.5 percent ahead of the same period last year and reached an all-time peak. Average load factors on all TWA flights in the record week ran 72.2 percent, with the coast-to-coast coach flights running at 93 percent of capacity.

Domestic Dismal.—Average earnings reports were less grim. The 16 domestic loadcarriers finished the first four months of the year with a \$31,150,000 operating loss, compared with a \$521,000 operating loss in the same 1949 period. Although revenues gained 5.6 percent, expenses jumped 4 percent.

The industry was well in the black by the end of May, but May and June of 1949 also anomalyously profitable. Even with record traffic there were some doubts that the \$10,460,000 operating profit shown at the end of fiscal 1949 could be equaled this year.

The figure in the earnings machine was Northwest, which had the best first four months of 1959. NWA had a \$4,163,000 operating deficit on its domestic services. To the same period last year, it lost only \$8,250,000.

Strike Recovery.—American has come back with a bang after a comparatively poor first quarter, when it was best by a strike. It showed a \$1,517,000 operating profit in April, compared with \$1,193,000 in the same month's last year. AA's May profits also are expected to be well ahead of 1949.

Other domestic carriers doing better financially in the first four months of 1959 than in the same period last year are Trans. Capital, Delta, Eastern Mid-Continent, National, TWA, United and Western Airlines Northwest; these losing record profits in closed Chicago & Southern, Calvert and Northwest.

Plan Saves Time on Capital Super DC-3s

An agreement between Douglas Aircraft Co. and Capital Airlines helps to explain why the carrier got its new Super DC-3s so swiftly lately.

Three weeks prior to delivery of the first Super DC-3 to Capital, Douglas a leasing that airline for experiencing prototype aircraft. Capital will then be able to conduct a series of test flights and expense all of its proving costs for CJA's Association Administration and its flight testing.

When the first Super DC-3 is delivered in mid-July, it will merely be necessary to "switch her out and put her into service," L. H. Glavin, Capital's chief engineer, says.

Capital has not yet completed final of three Super DC-3s to mid-August and plans to put them into service on Capital's "Tebirds Road" from Washington to Norfolk and Memphis. The series has 34 stops with average stops of about one hour.

LAI Will Fly North Atlantic Route

BOAC Optimistic

British Overseas Airways Corp. believes it is no longer carrying extra weight ratio its competitive flight for traffic.

St. Maarten Thomas, BOAC chairman, says his company is now a "lean, hardy and efficient organization with a high power weight ratio." Since April 1958, he declared, 47 persons in high salary brackets have been dropped from the payroll. Total personnel in 17,207 for the merged BOAC and British South American Airway Corp., composed with 24,464 for BOAC alone is a 1947

Productivity.—South—Capacity ton miles produced per engine hour from 1950 to 1958-1959 to 1959 in 1959. The latest advance, backlog on the highly competitive North Atlantic can be divided into the same period last year.

The classmate emphasized BOAC's substantial efforts for the past year to

steerling evaluation.

• Use of West aircraft on South American routes after Tordes were withdrawn from service.

• Training crews for new transports.

But the carrier is already showing reduced delays from substitution of modern, pressurized aircraft such as Canadair for the older types.

Boeing Help.—BOAC expects steady improvement in on-time performance on its all-new Boeing New York Line due service in May, for the third straight month, not far light over the route rate expected at cabin terminal.

The British carrier hopes to have its real rate improved shortly. Sir Miles said that if BOAC were paid at much per ton for carrying mail in its principal American destination, it would cause an all-new Boeing flight to become profitable.

Three weeks prior to delivery of the first Super DC-3 to Capital, Douglas a leasing that airline for experiencing prototype aircraft. Capital will then be able to conduct a series of test flights and expense all of its proving costs for CJA's Association Administration and its flight testing.

When the first Super DC-3 is delivered in mid-July, it will merely be necessary to "switch her out and put her into service," L. H. Glavin, Capital's chief engineer, says.

Capital has not yet completed final

of three Super DC-3s to mid-August

and plans to put them into service on

Capital's "Tebirds Road" from Wash-

ington to Norfolk and Memphis. The series has 34 stops with average stops of about one hour.

Transmission Level Gear for

Sikorsky SSS Helicopter

The Italian company Linee Aeree Italiane has received a license to manufacture a new gear ratio for Sikorsky SSS helicopter. LAI hopes to start service Rome-New York DC-6 service on July 15, basing schedules to begin weekly in August. Intermediate stops will be at Dakar, at Shannon, etc., Geneva, Neuchatel, and Boston.

Coastal Route.—TWA, the U.S. flag line certified to Italy, owns a 40-passenger aircraft in LAI but takes no active part in managing the Italian market. The Italian government has 90 percent of TWA's 10-passenger Italian connection holds the remaining 10 percent.

LAI has been operating domestic Italian services since early 1947, but has extended its routes to Istanbul, Tunis, Athens, Alexandria and Tel Aviv. It may also receive a link to

**the P.A. from So. Carolina
said to the
P.A. from No. Carolina**

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best source of precision
gear—need the parts to
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imports. He feels that while jet engines have "great potential," they must become more reliable and economical. "If we're going to buy them, we would have to estimate how many we were going to buy them." Smith thinks it will be "around five years" before jet planes are flying on scheduled airlines.

► American Overseas-Ela managed a new four-days-a-week internal German air service between Hamburg and Berlin.

► British Freight Airlines put new cargo records in May, with domestic cargo increases up 93 percent and international cargo increases up 183 percent over the same month last year.

► British European Airways—It now carries 20 million passengers annually. "We're getting good loads," says a senior BEA spokesman. "Passenger traffic in April was 19 percent ahead of the same month last year, and revenues were better than budget estimates."

► California Central—It has sold one 28-passenger Douglas DC-3 to Hawaiian Airlines and four similar craft to Pan Am Lines. The California institution has well over the DC-3 with DC-4s.

► Civil Aviation Board—It has suspended letters of registration held by three large regional carriers for failure to file quarterly flight reports. Notable affected are Economy Airways, New

York, Golden Airways, Manhattan Beach, Gold and Skyway International Trading & Transport Co., Milwaukee . . .

A team of maintenance engineers has begun a \$15,000 efficiency study of CAB and will attempt to minimize the agency's work.

► El Al Israel National Airforce—It has received a temporary foreign carrier waiver from CAB authorizing service from Israel to New York for a one-year period. The government-owned carrier has four DC-9s in and has leased 25 Ansons each as a nucleus for its flight and maintenance staff.

► Flying Tiger Line—Freight traffic on the carrier's confidential transoceanic system totalled \$1 million per week during the six months ended April 30, representing a 25 percent gain over the same period last year. President Robert W. Prentiss predicts even better results during the present six-month period. The company is operating 19 domestic stations equipped with six a year ago, and has more than doubled its fleet.

► KLM—Reports a loss of 39.5 million guilders (over \$10 million) in 1949 compared to a profit of 173.5 million guilders in 1948. Most of the deficit was suffered by the Amsterdam-Delhi-Batavia route. Loss will be covered by the Dutch government, but the assistance is being granted on condition of drastic curtailments.

► Panair—Expect delivery on two of its new DC-3s by the end of July, with the other two expected in December.

► Pan American—Made 55 DC-6 flights from Port of Rio to Michigan in eight days carrying 3100 Passengers. It is to work in single seat flights. Eastern Air Lines also participated in the emergency relief participated by the seven craft of a consolidated Winter Transport C-46 and the Puerto Rican government's cancellation of further non-scheduled flights.

► Pioneer—Carried 28 percent more passengers in the first few months of 1950 than in the same period last year.

► Shik—Few 2,900,122 revenue ton miles of freight in May and below the break even on its economic carrier loadline. Volume was up almost 500,000 ton miles over April, and load factor rose from 67.5 to 75.6 percent. Shik was successfully holding on a commitment to overbook 250 Air Force engines.

► TWA—Is making CAB approval of an interchange agreement which would provide the passenger service between points west of Albuquerque on TWA's transcontinental route and points south and east of Albuquerque on Continental Air Lines' routes into Texas. TWA has put one of its Boeing Stratobuses in storage after nearly 30 years and 25,000 hrs of service. First of 12 leased Martin 2-0-2As is to be delivered early next month.

► Western—Has asked CAB for a 50-mile "leaving limit" from Salt Lake City to Rapid City, S. D., via Cheyenne, Wyo. It would permit WAL to operate direct flights from Los Angeles to Minneapolis-St. Paul.

CAB SCHEDULE

July 10: Re-implementing restrictions on weight and dimensions of aircraft carrying passengers outside of America for nonstop transoceanic nonstop flights over certain points (Docket 4180).

July 10: Implementing standards on minimum pressurizing pressure (Docket 4180), effective from June 10 (Docket 4180).

July 10: Encouraging an increase in class rating in crew licensing (Docket 4180).

July 10: Encouraging an increase in minimum altitude and ceiling for certain aircraft (Docket 4180).

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LETTERS

GCA Spokesman

Capt. S. C. Robens's article in *Aerospace Week* (See II, page 11) states, "Defenses and pilots are reporting increasing concern over the real reliability of ILS. As an airline passenger, I am among 30,000 other passengers, I am not too worried."

Capt. Robens fails to give enough aviation readers and news writers on ILS any warning about the lack of warning of ILS failure.

CIA officials report that the standard ILS model has a built-in redundancy secondary to that of the bell and light indicating that the equipment is sound.

ILS experts advise that a 700 foot area in front of the ILS glidepath transmitter must be cleared of all noise to avoid being disturbed.

Capt. Robens's statement that the new approach to safety improvement "ILS is 'unreliable'" and his reference to "young" ILS installers causes me equally disturbing alarm and surprise.

Your editorial practice to Capt. Robens's article observes that, "pilot error accounts for 80 percent of all aircraft accidents and injuries." That is an excellent safety statement. On behalf of one voiceless manufacturer, I should like to correct several misstatements which Capt. Robens has regarding GCA.

(1) GCA can monitor ILS glide slopes

regardless of the location of the ILS track-down point. While ILS is not reliable, GCA is reliable so that the operator can draw the ILS glide slope on its GCA radar screen and fly directly to the ILS "fix" without deviation. It is true that the ILS glide slope has prominent leads, "line slopes," and fluctuations caused by weather, terrain or traffic, yet GCA glide is permanently straight and not affected by weather or terrain changes. Consequently, GCA glide does not fit the pilot perfectly when he is in flight because of wind, terrain and safety.

(2) Capt. Robens is also in error concerning new effects on GCA. The Senate Special Transportation and Aviation Committee on ILS has recommended that GCA be limited to the Anchorage, Alaska, facility. GCA has not been invited to San Francisco, and on the Board Audit it was not listed. Except for minor test flights and discussions the Faa Test Committee authorizes GCA to track planes through weather.

Capt. Robens's observations may be confirmed in the U.S. Air Force's aviation safety and hundreds of airline pilots who have now completed 10,000 GCA landings at Colorado and thousands of additional landings at Keflavik, Iceland, London, Paris, Berlin, Mannheim, Frankfurt, Stuttgart, New York, Washington and Chicago.

Capt. Robens states that, "a ship flying through light rain at 300 miles per hour is at risk, passing through solid water." It may seem that way to the pilot looking at the wind sheer but not to GCA on the ground. The plane may be in a tailwind condition and the GCA computer will not let the plane pass through the GCA boundaries "safe" in the seconds 1000 times per second so that the headwind effect between the speed of the plane and the run remains constant.

(3) GCA was selected at the primary landing system by the CAA, USAF, Navy, AFSC, RCAF, and USCG. Since GCA is not safe, it is not suitable for flight in winter, etc. and does not require control motion or sufficient ingenuity. It is a "closed loop" system in that the equipment is self-checking and cannot give false data. At this time there are GCA reports when GCA fails to land. This is not unusual, but for the past three years GCA normally reports more landings made on GCA than on ILS. GCA is in operation at 167 airports around the globe and since April and July they plan to add 1800 GCA landings every day to 7000 daily ILS landings. It is preferable that no other landing systems

LORRAINE DAVID CALLAHAN
Director of Public Relations
GCA Inc.
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Los Angeles 6, Calif.

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IATA Conference

Please tell Mr. Stein and George Chen that their invitation to the IATA Conference in Montreal, Canada, if symposium material was little short of marvelous. Would appreciate copies of current issue.

S. RALPH COHEN
Public Relations Officer
International Air Transport Assn.
Montreal, Canada

AIRPORT WEEK, May 3, 1958

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AVIATION (See II, 11) Address to office nearest 2000 Faa Test Site, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412.

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AIRPORT WEEK, July 3, 1958

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STRICTLY PERSONAL

THEY CALLED HIM UP TOO SOON—Latest story about parishioner aviator pilots concerns the beloved hero who kept walking up and down the aisle of a crowded plane to fight the other who deeply cherished in a book prominently labeled, "Never to Fly," his key moving laboriously.

MORE ABOUT OLD TIMERS

Admiral Louis DeForrest learned to fly in 1912 in a Wright airplane, Jerry Lufberg remembers Nov. 18 years later, he's flying jets. "There is a safety record here that will probably break if when he flies the first rocket." Jerry was with the Air Safety Foundation Committee, which has been working on a safety manual for the public. Jerry is now retired and is chairman of the New York Wing of the Commercial Pilot rating. Good passed his ASA's at Memphis on June 16 and was commissioned and on active duty after flying 100 hours. Now he is a weather flying master—no less! It's a plane with a circular seat like two pie plates joined together.

All these old timers are Early Birds. And how many of you leave what there qualifications and let WPA tell you "Membership shall be limited to those who piloted a glider or airplane, or held an airman's rating in Dec. 31, 1918, prior to date defined, selected by the membership committee and approved by the board of governors, except that National of aviation other than the U.S. assigned as World War I status have not the foregoing conditions prior to Aug. 4, 1914."

DR. VON FLUGEN'S AVIATION GLOSSARY

(Continued)

HAN STANDARD—A method of competitively crocheting pack products.
HAMMER BREAD STAIN—An ordinary method of finishing work.

HAND FORMING—An old type of powdership.

HAND FORMING—A type of plastic surgery.

HETEROGENEOUS RECEPTION—A process of gathering strayed by a mafley instrument of people.

HOFERFROST—Coffined expression for an arctic land.

HYDROGEN—An atomic heavier consisting of water and gas.

INDUCTION SYSTEM—A network of drift bands.

INVOLUTIVE—A forced condition evidenced by a lack of sufficient money.

JETT STRIKE—A dinner prepared on board planes.

KAFUT—A colloquial meaning "gone," "broken," or "all worked up."

LAF JOINT—A bar or other metallically having porous holes and/or slots lighting.

LIGHTENING HOLES—The process of removing stiff lugs from holes in order to make the aircraft faster.

LINN TRAILER—A device to train dogs.

LOCK WASHER—A lock washer holds.

LOUVER—An air measure in France.

LOW BEAMS—An amateur's amateur.

MACH NUMBER—A quantity encountered in flying one of which a enough of

MAGNETIC EQUATOR—An automatic oscillating machine.

MAGNETIC FIELD—A field of a number of a lateral organization.

MASTER OSCILLATOR—One who is older or longer.

MATING BEES—An animal, honeybee species.

MAXIMUM MEAN CANISTER—This is a common failure among aircraft eng-

ines. Actually, maximum does not mean number of all.

MAXWELL'S THEOREM—States that coffee is "gold to the last drop."

MECHANICAL LIFT—An automatic elevator. Also, see BRAZES.

MILITARY NUMBER—One who practices the profession of gnatistic arts by violent means.

MICROGRAPH—A small official in the Egyptian government.

MICROMETER—A very small meter.

MOMENT OF INERTIA—A short period of leisure.

(To be continued.)

TEAR JERKER—Northwest Airlines ushered the other day in a dramatic scene episode that brought tears to most of those concerned, including big, lumpy flight leaders at the Minneapolis air terminal. It seems high winds blotted New year from Detroit to the East Coast, except to New York state and uprooted a major portion of a newly planted crop of trees. And the next day before the owners available for an emergency shipment of seed to replace the devastated area, and that's why Northwest was flying a thousand pounds of trees and

WHAT'S NEW

Destination Moon

Space travel looks pretty easy in Destination Moon, a George Pal production released by Eagle-Lan's Film. And that's the only look to find with the entire movie, because the first Moon voyage will not compare to a transoceanic ride. But for now, here is a movie about flying that has had the benefit of intelligent writing, screening, and most important, direction.

It deals with the first trip to the Moon. An atom-powered rocket carries four men on the journey, and very nicely lets its lesson one on Earth in order to guarantee the return trip. Aboard that basically simple satellite has been woven the whole cloth of current thinking on Moon rockets.

► No Moonbeams Here—To begin with, the rocket looks big enough, and good enough, to do the job. Leisure arrangements, instrumentation, structural details all bear the stamp of objectivity. The four men, two scientists and two astronauts, the rocket moves around with little motor noise, and no radio communications are anything but clearly enunciated.

But it is the special effects that steal the show right out from under the nose of the festive action. Astronomical buildings have been painted by the incomparable Charles (Bramble) Easton, Earth never looks livelier than she does seen from the rocket against a velvet black night. The lunar landscape is cold and forbidding, and family-looking—Earth-like.

The tricks behind the scenes should stay a secret, but the crew walk up walls and float down as the camera obviously shows the free fall portion of the trajectory; outside the ship they hang inverted and walk around the hull in an upright position.

Well, it's still good the best nasty minutes spent in a theater since "Hell's Angels." And to make it even better, the film is in Technicolor. Don't see it now, because some day you may run another like it—the ticket of the first school trip to the Moon.

—D. A. A.

New Quarters

An Export International Agency, Inc. and Southern Freight Corp. have leased their ground and warehouse space from 40 Greenwich St. to 44 N.Y.C. St. The new consolidated N.Y. office and manufacturing plant have been translated from 405 Greenwich St. and 102-02 30th St., Corona, to South Ferry Slip 3 at the foot of Whitehall St.

R.H.W.

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EDITORIAL

Wider Publicity for Contracts

Industry and the public will gain from wider dissemination of information about military purchasing, announced by the Department of Defense.

As reported more fully in our issue of last week, names of firms awarded Army, Navy, and Air Force contracts of \$25,000 and over will be available weekly through 1200 Department of Commerce field offices.

The three services will prepare a weekly index of awards of unclassified, negotiated and formally advertised contracts.

For almost two years, one of the planks in Amerson Wink's editorial platform has been wider publicity for purchasing information. It was only 20 months ago that the Air Force was making an assessment of virtually all of its negotiated contracts. Only a few were released. Since negotiated contracts usually are larger than procurement publicly bid for, it meant that an important percentage of the public dollars spent by the Air Force with individual firms in industry were never publicly accounted for.

Amerson Wink finally went to the then Secretary for Air, W. Street Synderup, who subsequently ordered all unclassified negotiated contracts made available not only to this magazine but to the press generally. We have been publishing that information ever since.

The Defense Department deserves congratulations on thus making vital business and industry information freely available to those who need it. It is also, of course, in the best interests of the military services themselves to play off of their procurement cards on top of the table all the time. That is one sure way to stifle rumors of graft.

Handouts or Security?

The headlines say Congress agreed on a 70-group Air Force. Actually, the lawmakers said they wouldn't approve anything bigger than that. It's the "legal ceiling strength" of the Air Force. The truth is, they will appropriate annual sums to support a force anywhere below that top limit. It's all very confusing, but you see, politicians like to have their cake and eat it too.

Congress removed all vestiges of a provision for annual procurement of new aircraft. They also knocked out a stipulation that would have authorized the Air Force to procure \$200 new planes, or 42,500 aircraft total, every year.

So we have no national policy that informs our maintaining a healthy and adequate aircraft industry to fall back on in case the Russians become uncontrollable—which may mean almost anytime.

One legislative writer points out that 70 percent of the 13,000 serviceable planes the USAF has were designed before 1940.

A few days before the Korean armistice became effective Mr. Truman and we cannot afford a 70-group air force, only about 48 groups. This force is described by our military leaders as weakly weak.

But now legislation looks certain authorizing another

two billion dollars to purchase surplus farm products. We already spend more money every year on government-growing plants than we do on guided missiles. We now propose to throw away still another couple of billion on handbooks, while we hold down our Air Force. What could be better news for the Russians?

Abolishing the Races

So they've canceled the National Air Races for 1950. That is good for aviation. It might save lives, too.

We doubt if these races are ever held again, at least in the form we all know them. We hope the 1949 board is gone forever.

The final blow to this year's event was Secretary Johnson's order to the Air Force and Navy to stay out.

The crash of popular pilot Bill Odeon's plane into a house, killing Bill and two occupants of the house, dropped a pall over last year's spectacle. It also shocked the show management into realizing the terrible risk they were taking every year in permitting, even encouraging, high speed meets and stunts to whatever extent the heavily populated Cleveland area.

There may have been a time when the Cleveland races contributed something to the technical progress of aviation. If ever there was such a time, it is long since past. The great industry and government laboratories and wind tunnels, and the grueling flight test programs, have taken over in an impressive style, scarcely in conceivable measure.

Nothing was left in Cleveland but a sort of Roman holiday after that was a chance to human life and a congenial place for aviation people to get together and hangarify while they paid no attention at all to the race.

Congressional aviation's whole future depends on wide public acceptance. That acceptance depends on public confidence in the present and potential safety of commercial flying. Such acceptance is growing rapidly. But despite the fact that the National Safety Council gives scheduled airlines a better safety rate than the private auto and truck, public acceptance of the commercial airlines still lags far behind that of the general aviation route.

As long as it does lag behind the car, we certainly cannot afford the luxury of any Roman holidays like the National Air Races in the reckless manner to which they are accustomed.

There are still too many good, potential customers of the airlines who to this day associate non-commercial air accidents with commercial air safety. One answer to this, of course, is a continuous program of information and education. Another is to stop needless stunts at air shows and races somewhere against humans at least that one type of airplane accident, anyhow.

When we get the money to the point where they stop believing that the airplane—any airplane—is inherently unsafe, then perhaps we can put on a show like yesterday's annual Memorial Day race at Indianapolis. But aviation has not yet reached that enviable stage. Let's help get it there as soon as possible.

—Robert H. Wood

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